

Unit 2 Study Guide

SC4. Students will use the organization of the Periodic Table to predict properties of elements.

- Use the Periodic Table to predict periodic trends including atomic radii, ionic radii, ionization energy, and electro-negativity of various elements.
- Compare and contrast trends in the chemical and physical properties of elements and their placement on the Periodic Table.

Matching

Match each item with the correct statement below.

- | | |
|----------------------|---------------------|
| a. electronegativity | e. transition metal |
| b. ionization energy | f. periodic law |
| c. atomic radius | g. group |
| d. period | |

- _____ 1. horizontal row in the periodic table
- _____ 2. energy required to remove an electron from an atom
- _____ 3. ability of an atom to attract electrons when the atom is in a compound
- _____ 4. type of element characterized by the presence of electrons in the *d* orbital
- _____ 5. one-half the distance between the nuclei of two atoms when the atoms are joined
- _____ 6. A repetition of properties occurs when elements are arranged in order of increasing atomic number.
- _____ 7. vertical column in the periodic table

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 8. Which of the following elements is in the same period as phosphorus?
 - a. magnesium
 - b. oxygen
 - c. nitrogen
 - d. carbon
- _____ 9. Metalloids are elements that
 - a. do not form compounds.
 - b. can conduct heat and electricity under certain conditions.
 - c. have large atomic masses but small atomic numbers.
 - d. are extremely hard.
- _____ 10. The modern periodic table is arranged in order of increasing atomic _____.
 - a. mass
 - b. radius
 - c. charge
 - d. number
- _____ 11. What is the energy required to remove an electron from an atom in the gaseous state called?
 - a. electronegative energy
 - b. nuclear energy
 - c. shielding energy
 - d. ionization energy
- _____ 12. What element in the second period has the largest atomic radius?
 - a. lithium
 - b. neon
 - c. carbon
 - d. potassium

- _____ 13. At room temperature, none of the metals are
- malleable.
 - soft.
 - gases.
 - liquids.
- _____ 14. Mendeleev arranged the known chemical elements in a table according to increasing
- mass.
 - number of electrons.
 - atomic number.
 - number of protons.
- _____ 15. What is the element with the highest electronegativity value?
- helium
 - cesium
 - calcium
 - fluorine
- _____ 16. Of the elements Fe, Hg, U, and Te, which is a representative element?
- Te
 - U
 - Fe
 - Hg
- _____ 17. Which statement about noble gases is correct?
- They form compounds with very bright colors.
 - They are extremely rare in nature.
 - They are highly reactive with both metals and nonmetals.
 - They exist as single atoms rather than as molecules.
- _____ 18. Most halogens form compounds by
- losing an electron to form a positive ion.
 - gaining an electron to form a negative ion.
 - losing protons.
 - joining with both calcium and carbon.
- _____ 19. Which statement is NOT true about the elements fluorine, chlorine, and iodine?
- They are similar to noble gases.
 - They are all halogens.
 - They react easily with metals.
 - They are all nonmetals.
- _____ 20. How does atomic radius change from left to right across a period in the periodic table?
- It tends to increase.
 - It tends to decrease.
 - It first decreases, then increases.
 - It first increases, then decreases.
- _____ 21. How does atomic radius change from top to bottom in a group in the periodic table?
- It tends to decrease.
 - It first decreases, then increases.
 - It first increases, then decreases.
 - It tends to increase.
- _____ 22. As you move from left to right across the second period of the periodic table _____.
- atomic mass decreases
 - atomic radii increase
 - ionization energy increases
 - electronegativity decreases
- _____ 23. As you move from left to right across a period, the number of valence electrons
- increases and then decreases.
 - increases.
 - decreases.
 - stays the same.
- _____ 24. Which of the following statements correctly compares the relative size of an ion to its neutral atom?
- The radius of a cation is identical to the radius of its neutral atom.
 - The radius of an anion is greater than the radius of its neutral atom.
 - The radius of a cation is greater than the radius of its neutral atom.
 - The radius of an anion is identical to the radius of its neutral atom.
- _____ 25. Which of the following categories includes the majority of the elements?
- metalloids
 - nonmetals
 - metals
 - liquids

- _____ 26. What is the element with the lowest electronegativity value?
- a. calcium
 - b. helium
 - c. cesium
 - d. fluorine
- _____ 27. Each period in the periodic table corresponds to _____.
- a. an orbital
 - b. a suborbital
 - c. an energy sublevel
 - d. a principal energy level
- _____ 28. Group 18 noble gases are inert because
- a. they can have either a positive or a negative charge.
 - b. their outermost energy level is full.
 - c. their outermost energy level is missing one electron.
 - d. they readily form positive ions.
- _____ 29. Which of the following elements has the smallest atomic radius?
- a. bromine
 - b. sulfur
 - c. selenium
 - d. chlorine
- _____ 30. Which of the following gases emit colors when an electric current is applied?
- a. hydrogen and helium
 - b. helium and neon
 - c. oxygen and nitrogen
 - d. fluorine and chlorine
- _____ 31. Carbon and other nonmetals are found in which area of the periodic table?
- a. On the left-most side.
 - b. In the bottom rows.
 - c. On the right side.
 - d. In the middle column of the periodic table.
- _____ 32. Atomic size generally _____.
- a. increases as you move from left to right across a period
 - b. decreases as you move from top to bottom within a group
 - c. remains constant within a period
 - d. decreases as you move from left to right across a period
- _____ 33. An alkali metal has one valence electron, while an alkaline earth metal has
- a. none.
 - b. three.
 - c. four.
 - d. two.
- _____ 34. To what category of elements does an element belong if it is a poor conductor of electricity?
- a. metalloids
 - b. nonmetals
 - c. metals
 - d. transition elements
- _____ 35. Alkali metals are extremely reactive because they
- a. have two valence electrons that form compounds with calcium and magnesium.
 - b. have one valence electron that is easily removed to form a positive ion.
 - c. have very small atomic masses.
 - d. are not solids at room temperature.
- _____ 36. Among the alkali metals, the tendency to react with other substances
- a. varies in an unpredictable way within the group.
 - b. decreases from top to bottom within the group.
 - c. does not vary among the members of each group.
 - d. increases from top to bottom within the group.

Name: _____

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- _____ 37. Which general statement does NOT apply to metals?
- a. Most metals are good conductors of electric current.
 - b. Most metals are ductile.
 - c. Most metals are brittle.
 - d. Most metals are malleable.